



## An analysis of consanguineous marriage in the Muslim population of India at regional and state levels

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**Summary.** Consanguineous marriage is widely favoured in a large majority of the world's Islamic populations. According to recent estimates, the resident Muslim population of India is over 100 million. However, apart from a few numerically small or geographically defined surveys, little is known about their patterns of marriage preferences since partition of the Indian Subcontinent in 1947. This study seeks to determine the prevalence and patterns of consanguineous marriages contracted among Indian Muslims at regional and state levels during the last two generations. Data from the 1992/93 Indian National Family Health Survey (NFHS) were used in the analysis. The NFHS was a nationally-representative survey of ever-married women aged 13–49 years, conducted across 25 states of India. Of the initial 9845 respondents, 8436 were included in the final weighted analysis sample. Overall, 22.0% of marriages were found to be contracted between spouses related as second cousins or closer, ranging from 15.9% in the eastern states to 32.9% in the western states of India. In all parts of the country first cousin marriages were the preferred form of consanguineous union, and in four of the five regions paternal first cousin marriages predominated. Despite predictions to the contrary, there was no evidence of a significant change in the prevalence of consanguineous unions over the course of the study period, which extended from the late 1950s to the early 1990s.

### 1. Introduction

According to the 1991 Census of India, the national Muslim population, excluding the state of Jammu and Kashmir, numbered over 100 million and comprised approximately 12% of the national total (Office of Registrar General and Census Commission 1995). In common with many other populations of West and South Asia, consanguineous marriages are believed to be widely preferential among Indian Muslims. As illustrated by the studies cited in table 1, many of which were collected within a generation of the major population disruption that accompanied partition of the Indian sub-continent, there is evidence of significant variation in the levels of consanguinity reported from Muslim communities in different regions of the country. However, since there were marked discrepancies in the design of the studies undertaken, particularly with respect to the different types of inbred union recorded, these inter-population comparisons may be misleading.

With only a few exceptions, in more recent years there has been a marked paucity of data on the overall frequency and the patterns of regional variation in Muslim consanguineous unions. The principal aim of the present investigation was therefore to provide information on the present-day prevalence of marriages between close biological relatives in the Muslim communities of India, which collectively with Indonesia, Pakistan and Bangladesh comprise the four largest national Islamic populations. Supplementary goals of the study were to assess variations in the patterns of Muslim marriage observed by region and between individual Indian states.

Table 1. The prevalence and patterns of Muslim consanguineous marriages in India.

R region	Location	Collection period	Study population	Sample size	Consanguinity (%)	Consanguinity types	Coefficient of inbreeding	Reference
North India	Delhi (Sunni)	–	Household survey	1483	24.4	1C, 11/2C, 2C	0.0100	Basu (1975, 1978)
	Lucknow (Shia)	–	Household survey	1000	43.4	1C, 11/2C, 2C	0.0202	Basu (1975, 1978)
	Udaipur (Dawoodi Bohra)	–	Household survey	957	41.1	1C, 11/2C, 2C	0.0218	Basu (1975, 1978)
	Delhi (Sunni)	–	Household survey	502	36.5	1C, 11/2C, 2C	0.0180	Krishnan (1986)
	West Bengal	1969/71	Household survey	835	22.2	1C, 2C	0.0135	Huq (1976)
East India	Assam (rural)	–	Household survey	203	3.0	1C	0.0025	Mukherjee and Chakravarty (1977)
	Bihar (suburban)	–	Household survey	7209	24.0	1C	0.0150	Afzal (1988)
	Bihar (rural)	–	Household survey	4524	39.9	1C	0.0249	Afzal (1988)
	Bihar (All Muslim)	–	Household survey	476	13.9	1C, 2C	0.0076	Ansari and Sinha (1978)
	Madhya Pradesh	–	–	451	46.1	UN, 1C, 2C	0.0215	Goswami (1970)
West India	Bombay	–	–	1436	21.8	1C, 11/2C, 2C	0.0095	Sanghvi <i>et al.</i> (1956)
South India	Karnataka	1980/89	Obstetric inpatients	17019	23.7	UN, 1C, 2C	0.0160	Bittles <i>et al.</i> (1991)

Key: UN, uncle-niece; 1C, first cousin; 11/2C, first cousin once removed; 2C, second cousin

## 2. Subjects and methods

The data utilized were drawn from the Indian National Family Health Survey (NFHS), a representative, cross-sectional demographic and health survey conducted during the years 1992 and 1993. The 24 states of India and the National Capital Territory of Delhi covered by the survey account for an estimated 99% of the total population (figure 1). The NFHS was a household sample survey based on 89 777 ever-married females aged 13–49 years, with all interviews conducted by trained female personnel in the women's own language. For the purposes of the present analysis, data on the Muslim populations surveyed by the NFHS were abstracted from the returns at state level.

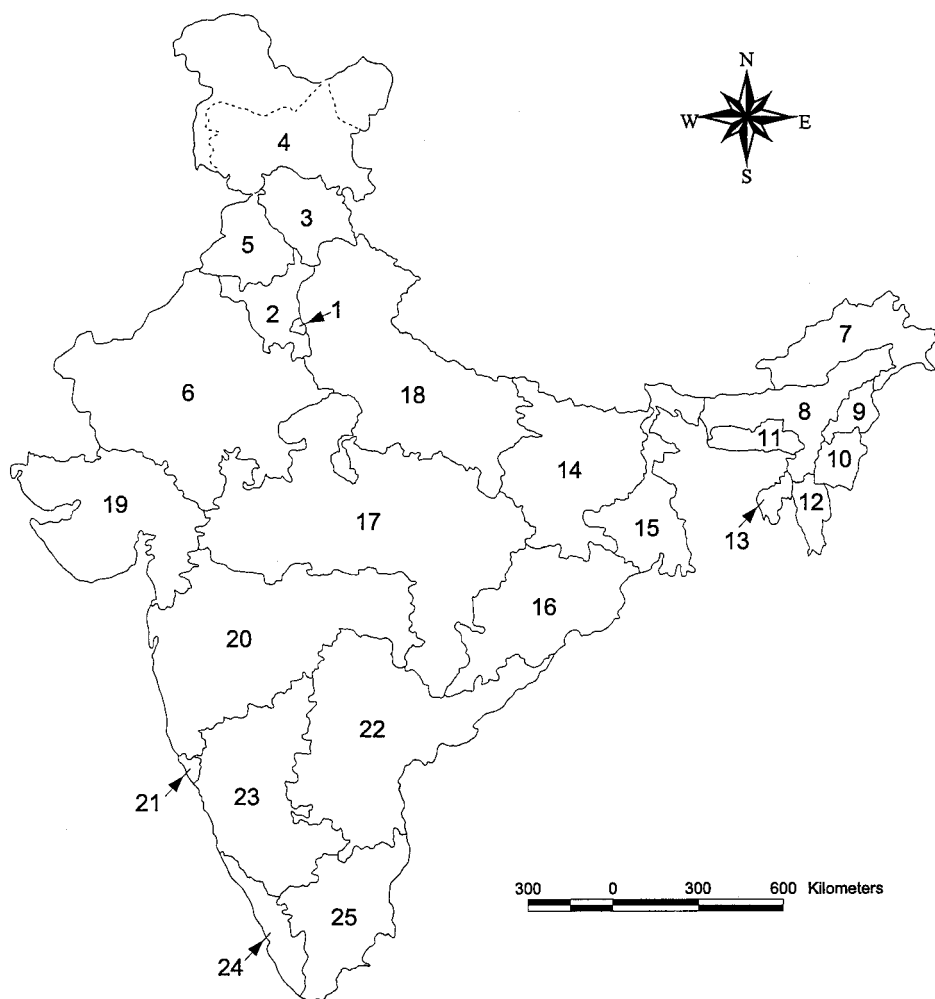


Figure 1. Map of India. *North India* State or Territory: 1. Delhi; 2. Haryana; 3. Himachal Pradesh; 4. Jammu and Kashmir; 5. Punjab; 6. Rajasthan. *East India*: 7. Arunachal Pradesh 8. Assam; 9. Nagaland; 10. Manipur; 11. Meghalaya; 12. Mizoram; 13. Tripura; 14. Bihar; 15. West Bengal; 16. Orissa. *Central India*: 17. Madhya Pradesh; 18. Uttar Pradesh. *West India*: 19. Gujarat; 20. Maharashtra; 21. Goa. *South India*: 22. Andhra Pradesh; 23. Karnataka; 24. Kerala; 25. Tamil Nadu. - - - Disputed international boundary.

Of the 89 777 ever-married females enrolled in the NFHS, 9485 women were listed as Muslim. The analysis sample was weighted according to the state weights provided in the NFHS data set, since one of the primary interests of the study was to assess regional and state-level variation in marriage patterns. The final analysis sample included data collected from 8436 women. Of the 1049 cases excluded, 739 were women who were not usual residents of the household, 301 cases were women who reported more than one marriage, and in 9 cases information on the consanguinity status of the respondent was incomplete.

The NFHS questionnaire contained two schedules: for the household included in the sampling frame, and for women eligible for the women's questionnaire, i.e., ever-married females aged 13–49 years. The women's questionnaire thus initially included a small number of cases where the respondent was a visitor to the household but, as indicated above, these cases were excluded from the analysis sample. Two questions were included on consanguinity. First, whether the respondent was biologically related to her husband before marriage and second, if answered in the affirmative, the exact nature of the relationship. In these latter cases the respondents variously reported their spouses to be an uncle, equivalent in their progeny to a coefficient of inbreeding of  $F = 0.125$ , a paternal or maternal first cousin ( $F = 0.0625$ ), a second cousin ( $F = 0.0156$ ), or 'other biological relative' ( $F$  unspecified).

Although 2315 respondents reported a consanguineous marriage in response to the first question, the number decreased to 2156 when the more rigorous second-stage definition was used. In the present study, the responses to the second question were accepted as the more accurate in defining consanguinity and for this reason they were used in the analyses. To maintain comparability with earlier local surveys (table 1), and since the 'other biological relative' category ( $n = 301$ ) could not be precisely defined in terms of the level of genetic relatedness of the marriage partners, only unions between second cousins or closer ( $n = 1855$ ) were classified as consanguineous in calculating the percentage consanguinity and mean coefficients of inbreeding at state and regional levels.

### 3. Results

#### 3.1. Prevalence and types of consanguineous unions

The overall prevalence of consanguineous unions between spouses related as second cousins or closer ( $F \geq 0.0156$ ) was 22.0%. As indicated in table 2, there was quite marked regional variation in the prevalence of consanguinity. For example, the lowest reported prevalence of consanguineous unions was in East India (15.9%) and the highest in West India (32.9%). The former results may, however, be attributed in part to the very few Muslims enumerated by the NFHS in the smaller eastern states of India, such as Arunachal Pradesh, Mizoram and Nagaland (table 2). Mean coefficient of inbreeding ( $\alpha$ ) values calculated for each of the regions were: North India, 0.0130; East India, 0.0097, Central India, 0.0168, West India, 0.0201, and South India, 0.0111.

The analysis by state revealed that in modern India, the highest prevalence of consanguineous unions were recorded in Jammu, part of Jammu and Kashmir which is the only Indian state with a Muslim majority, whereas the lowest consanguinity rates were in Haryana and Punjab. These findings can most convincingly be interpreted in terms of the differential demographic distribution of Muslims in North India since, following partition of the sub-continent, there was substantial Muslim migration to Pakistan from the eastern parts of the former unified state of Punjab

Table 2. Variation in prevalence of consanguineous unions by region and state.

Region	State	Consanguinity, %† ( $F \geq 0.0156$ )	Total cases‡
North India	Delhi	18.7	315
	Haryana	1.0	101
	Himachal Pradesh	6.1	33
	Jammu (and Kashmir)	40.4	418
	Punjab	2.9	34
	Rajasthan	13.6	264
East India	Arunachal Pradesh	0.0	6
	Assam	3.8	762
	Bihar	27.8	814
	Manipur	13.5	52
	Meghalaya	4.0	25
	Mizoram	0.0	3
	Nagaland	0.0	8
	Orissa	13.5	59
	Tripura	9.9	80
	West Bengal	16.8	814
Central India	Madhya Pradesh	19.8	278
	Uttar Pradesh	28.7	1541
West India	Goa	18.8	154
	Gujarat	36.3	303
	Maharashtra	35.7	460
South India	Andhra Pradesh	29.7	320
	Karnataka	27.2	427
	Kerala	9.4	957
	Tamil Nadu	33.2	214
All-India		22.0	8436

Note; † Comprises uncle-niece, first and second cousin unions  
‡ Includes marriages between 'Other relatives',  $F \leq 0.0156$

(now subdivided within India as Haryana and Punjab). In a similar manner, the highest prevalence of consanguinity in East India was reported for Bihar, which is a heavily populated state on the Gangetic plain with a substantial Muslim minority population. By contrast, few differences were reported in the prevalence of consanguineous marriage in the states of Central, West and South India, the only notable exception being Kerala where, irrespective of religious affiliation, consanguinity levels previously had been observed to be significantly lower than in the other three Dravidian states of South India (Kumar *et al.* 1967, Ali 1968).

First cousin unions were the most common type of Muslim consanguineous marriage in all regions of India, comprising 20.0% of all marriages (table 3). Paternal first cousin marriages were more common than maternal first cousin marriages in four of the five regions. The exception was West India, more particularly in the states of Gujarat and Maharashtra, where maternal cousin marriages were the most popular form of consanguineous union. Unfortunately, the lack of further information in the NFHS on the four possible types of first cousin unions (parallel and cross,

Table 3. Types of Muslim consanguineous marriage by region.

Region	Consanguineous marriage % (and number)						
	Uncle-niece	Paternal first cousin	Maternal first cousin	Second cousin	Other related	Not related	Consanguinity % ( $F \geq 0.0156$ )
North India	0.7 (8)	10.5 (123)	9.4 (110)	2.4 (28)	4.7 (55)	72.2 (842)	23.0 (1166)
East India	0.6 (15)	7.8 (204)	6.5 (171)	0.9 (25)	2.3 (62)	81.8 (2146)	15.8 (2622)
Central India	0.2 (4)	13.8 (251)	12.3 (223)	1.0 (19)	3.1 (56)	69.6 (1266)	27.3 (1819)
West India	0.6 (6)	14.8 (136)	16.2 (149)	1.3 (12)	5.9 (54)	61.1 (560)	33.0 (917)
South India	0.2 (4)	9.3 (178)	7.3 (140)	2.6 (49)	3.9 (74)	76.7 (1467)	19.4 (1912)
All-India	0.4 (37)	10.6 (892)	9.4 (793)	1.6 (133)	3.6 (301)	74.4 (6280)	22.0 (8436)

paternal and maternal) precluded the possibility of additional analyses being undertaken into regional preference for cross or parallel cousin unions.

Unions between second cousins constituted 1.6% of all marriages and a small number of uncle-niece unions (0.4%) also were reported in the NFHS. Interestingly, uncle-niece marriages were not restricted to South India where they are widely favoured by the majority Hindu population and to a lesser extent Christians (Bittles *et al.* 1991), with 15 of the 37 uncle-niece unions recorded in the eastern state of Bihar.

3.2. Temporal trend

No consistent pattern of increase or decrease in the preference for consanguineous unions was observed across the four decades covered by the NFHS, from the mid to late 1950s to the early 1990s (figure 2). The observed minor fluctuations in the prevalence of consanguinity over the 40-year study period probably reflect variations in the NFHS age-specific sample, and in the composition of the available marriage pool for respective cohorts, rather than being indicative of major changes in cultural or societal influences.

Through time, there appeared to be a consistently higher prevalence of Muslim consanguineous unions in West India, especially in Gujarat and Maharashtra, while the lowest levels were found in East India. Among the populations of the other three regions, consanguineous unions in North and Central India accounted for approximately 25% of the total during the study period, with some evidence of an increasing proportion through time, while in South India their prevalence had levelled off at 18% of all marriages by the end of the study period (figure 2). It should however be noted that in the NFHS, the numbers of marriages studied in Kerala were disproportionately large in terms of the total state population. As consanguineous unions are much less frequent in Kerala than the other southern states, to some extent this over-representation may have resulted in partial distortion of the regional picture. In addition, the Muslims of Kerala, known as the Malabar Muslims or *Mappillas*, are a distinct community with its own customs and practices which claims descent from Arab traders who settled permanently on the Malabar coast in the 8th century AD (Thapar 1986), whereas the other Muslim communities in South India are

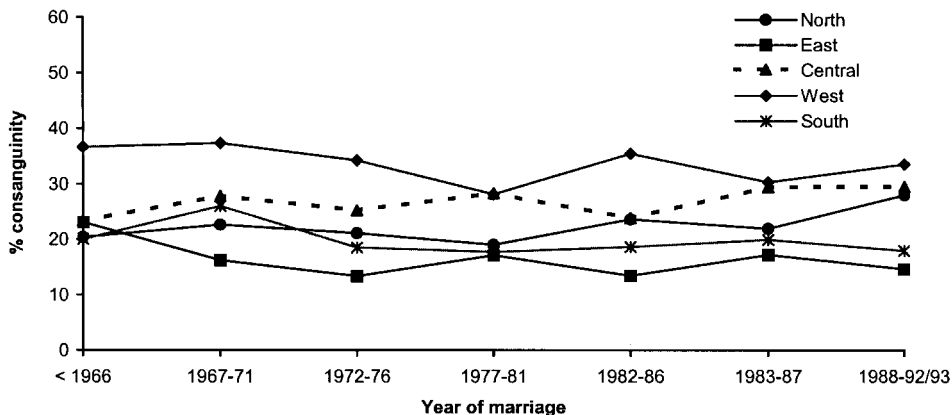


Figure 2. Trends in consanguineous marriage ( $F \geq 0.0156$ ) among the Muslim population of India, by region, 1957–1992/93.

believed to have originated mainly from Hindu conversions to Islam from the 16th century onwards.

#### 4. Discussion

By comparison with the data provided in table 1, the overall prevalence of 22.0% consanguineous unions among the Muslim population included in the NFHS sample appears to be somewhat low. However, it must be borne in mind that the earlier studies largely were undertaken in specific areas with substantial Muslim minority populations, whereas the NFHS covered all states and its sampling frame was reflective of the current demographic distribution of both majority and minority population subgroups in India.

As previously indicated, partition of the Indian sub-Continent in 1947 exerted a major demographic effect on the populations of North India, and in some regions its influence was clearly seen in the marriage patterns of the Muslim minority. For example, a study of Sunni Muslims resident in Old Delhi indicated that prior to 1947 the prevalence of consanguineous marriage in the community was 15.9%, but in the post-Independence cohort it had increased to 37.4% (Basu and Roy 1972).

Although the NFHS data show that the prevalence of consanguineous unions in the Muslim population varies across the five regions of India, they also reveal that the overall levels of these unions have essentially remained stable over the last four decades. Similar findings were reported from the analysis of the Pakistan Demographic and Health Survey (PDHS) conducted in 1990/91. While the total prevalence of consanguinity in Pakistan was much higher at 61.3%, no appreciable decline was seen in the proportion of consanguineous unions contracted for the period covered by the survey from the 1950s and the 1980s (Grant and Bittles 1997, Hussain and Bittles 1998).

With regard to the types of consanguineous union recorded, the NFHS data were in close correlation with the patterns observed in previous studies and, among Muslim communities throughout India, first cousin marriages continue to be the predominant type of consanguineous union. The prevalence of second cousin marriages seems to have decreased markedly through time to just 1.6% in the last decade

of the NFHS sample, a finding that also was apparent from a number of earlier studies.

Although uncle-niece marriage is proscribed by the *Koran*, the inclusion of a question on these marriages in the NHFS does not appear to have resulted in reporting or recording errors. Evidence of uncle-niece marriages within Indian Muslim communities had been reported in a number of earlier investigations. For example, among five Muslim population isolates in Maharashtra the prevalence of uncle-niece marriages was 9.5% (Malhotra *et al.* 1977). Similarly, 5.0% of all marriages among the Muslims of Delhi in the immediate post-partition period were uncle-niece unions (Basu and Roy 1972). In contrast, studies from South India showed a much lower prevalence of such marriages: 3.4% in Andhra Pradesh (Sanghvi 1966), 0.2% in Tamil Nadu (Roychoudhury 1980), 3.7% in Karnataka (Bittles *et al.* 1991), and zero in Kerala (Ali 1968), despite their popularity in the co-resident Hindu and Christian populations.

As shown in table 1 the preference for consanguineous marriages among Indian Muslims may vary by sect, e.g. Sunni versus Shia versus Dawoodi Bohra, and according to clan affiliation. However, the NFHS data are limited in their scope to questions pertaining to religion and scheduled caste or tribe. Therefore the analysis could not be extended to examine the question of differences in marriage preference among the different clan groups.

In conclusion, the study clearly indicates that, with the exception of some minor regional changes, there is little evidence of any recent, substantial alteration in the popularity of consanguineous unions among the Muslim communities of India. Given the high fertility which is reported in these communities (Kulkarni and Choe 1998), which has resulted in an increase in the Muslim population of India from under 9.9% of the total in 1951 to 12.0% in 1991, it can be predicted that elevated levels of otherwise rare recessive disorders would be revealed by comprehensive testing programmes. Under these circumstances, planning for the delivery of genetic services appropriate to the specific needs of the communities would be warranted.

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**Zusammenfassung.** In großen Teilen der islamischen Weltbevölkerung wird eine Verwandtenheirat bevorzugt. Nach gegenwärtigen Schätzungen leben in Indien mehr als 100 Millionen Muslims. Abgesehen von einigen numerisch kleinen oder geographisch beschränkten Untersuchungen ist über ihre bevorzugten Heiratsmuster seit der Trennung des indischen Subkontinents im Jahr 1947 wenig bekannt. In der vorliegenden Studie sollen die Prävalenz und die Muster konsanguiner Heiraten bei indischen Muslims in den letzten beiden Generationen auf regionaler und Landesebene untersucht werden. Die Untersuchung basiert auf Daten aus dem in den Jahren 1992/93 durchgeführten Indian National Family Health Survey (NFHS). Der NFHS war ein landesweiter repräsentativer Survey an Frauen, die jemals verheiratet waren, im Alter von 13 bis 49 Jahren. Die Erhebung wurde in 25 Bundesstaaten Indiens durchgeführt. Von den insgesamt 9485 Respondent wurden 8436 in die spätere gewichtete Analysestichprobe einbezogen. Insgesamt waren 22% der Ehen zwischen Cousins zweiten Grades oder näher verwandten Ehepartnern geschlossen worden. Dieser Anteil variierte von 15.9% in den östlichen und 32.9% in den westlichen indischen Bundesstaaten. In allen Teilen des Landes war die Heirat zwischen Cousins ersten Grades die bevorzugte Form von Verwandtenehen. In vier der fünf Regionen dominierten Heiraten mit dem väterlichen Cousin ersten Grades. Trotz gegenteiliger Prädiktionen gab es keinen Hinweis auf eine signifikante Veränderung in der Prävalenz konsanguiner Eheschließungen im Verlauf der Zeit, die durch die Studie abgedeckt wurde, d.h. von den späten 50er bis zu den 90er Jahren.

**Résumé.** Le mariage entre apparentés est communément favorisé dans un grand nombre de populations musulmanes. D'après des estimations récentes, la population musulmane résidant en Inde dépasserait 100 millions de personnes, mais malgré cela et à l'exception de quelques études locales ou numériquement limitées, peu de choses sont connues de ses comportements matrimoniaux depuis la bipartition du sous-continent indien en 1947. Cette étude cherche à déterminer la prévalence et les formes des mariages consanguins contractés par les indiens musulmans au cours des deux dernières générations, tant aux niveaux régionaux qu'à ceux des états. Des données de l'Enquête Nationale de Santé de la Famille (ENSF) effectuée dans 25 états de l'Inde et représentatives au niveau national de toutes les femmes mariées de 13 à 49 ans, ont été utilisées dans l'analyse. 8436 des 9485 sujets initialement observés ont été finalement retenus dans l'échantillon pondéré soumis à l'analyse. On a observé 22,0% de mariages contractés entre conjoints apparentés au niveau de cousins issus de germains ou à un niveau encore plus proche, variant de 15,9% dans les états orientaux à 32,9% dans les états occidentaux de l'Inde. Dans toutes les régions, la forme d'union consanguine la plus prise est entre cousins germains et dans quatre des cinq régions, les mariages entre cousins germains parallèles prédominent. En dépit de prédictions contraires, on n'observe pas de changement significatif de la prévalence des unions consanguines au cours de la période couverte par l'étude, depuis la fin des années 50 jusqu'au début des années 90.